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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,559	02/19/2002	Carl B. Freidhoff	2662-140	1467

6449 7590 01/02/2004

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EXAMINER

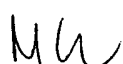
HA, NATHAN W

ART UNIT PAPER NUMBER

2814

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<b>Application No.</b> 10/076,559	<b>Applicant(s)</b> FREIDHOFF, CARL B.	
	<b>Examiner</b> Nathan W. Ha	<b>Art Unit</b> 2814	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 and 22-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-20 is/are allowed.
- 6) ☒ Claim(s) 1-15 and 22-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All   b) ☐ Some \* c) ☐ None of:  
     1. ☐ Certified copies of the priority documents have been received.  
     2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
     3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351 (a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 2, 4-6, 8-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Habermehl et al., US 6,174,820 B1.

Re claim 1, Habermehl et al. disclose a method of manufacturing a micro electromechanical device (e.g. Figures 5a-5q) comprising the steps of: forming a moving member (110) on a first substrate (12) such that a first sacrificial layer (34) is disposed between the moving member and the substrate; encapsulating the moving member, including the first sacrificial layer, with a second sacrificial layer (34); coating the second sacrificial layer with a first film (70/72) formed of a material that establishes

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a hermetic seal with the substrate; and removing the first and second sacrificial layers (e.g. column 14, lines 8-12 and column 15, lines 3-5.)

Re claim 2, the method disclosed by Habermehl et al., further comprises the step of forming an opening (92) in the first film prior to removing the first and second sacrificial layers (e.g. column 16, lines 28-40).

Re claim 4, in the method disclosed by Habermehl et al., the opening-forming step is performed after the coating step (e.g. column 16, lines 28-40 and Figure 5p).

Re claim 5, the method disclosed by Habermehl et al., further comprises the step of sealing (94) the opening after the first and second sacrificial layers are removed (e.g. column 16, lines 44-45 and Figure 5q.)

Re claim 6, in the method disclosed by Habermehl et al., the sealing step is performed by depositing (coating) a second film on the first film wherein the second film formed of the same material as the first film (e.g. column 16, lines 44-45, Figure 5q and column 14, lines 9-10.)

Re claim 8, the method disclosed by Habermehl et al., further comprises the step of forming a conductive layer (86) on the first film (e.g. column 15, lines 30-45 and Figure 5m.)

Re claim 9, the method disclosed by Habermehl et al., further comprises the step of coating the conductive layer with a second film (88) such that the conductive layer is disposed between the first and second films (e.g. column 15, lines 46-65 and Figure 5n).

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Re claim 10, in the method disclosed by Habermehl et al., the second film is made from the same material as the first film (e.g. column 15, lines 53.)

Re claim 11, the method disclosed by Habermehl et al., further comprises the step of connecting the conductive layer with a second circuit (e.g. Figure 5m.)

Regarding the intended use limitation recited on line three of the claim (i.e. "that causes the conductive layer to act as a counter electrode"), it has been ruled that in a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963.)

Re claim 12, in the method disclosed by Habermehl et al., the micro-electromechanical device is formed on a substrate with other circuit components and the first film covers only the micro-electromechanical device (e.g. Figure 5k).

2. Claims 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Montague et al., US 5,798,283.

Re claim 22, Montague et al., disclose a method of fabricating a micro-electromechanical system (MEMS) device (e.g. Figures 2-13) comprising the steps of: forming a control circuit with an actuating element (24) on a substrate (e.g. column 6, lines 8-13); forming a first sacrificial layer (30) over the actuating element, depositing a conductive material (26) such that the material extends from the circuit to cover the first sacrificial layer, and removing portions of the first sacrificial layer (e.g. column 5, lines 45-46), encapsulating the moving member on all sides with a second sacrificial layer

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(32); coating the second sacrificial layer with a material (34) that forms an hermetic seal with the substrate; and removing the first and second sacrificial layers (e.g. Figure 12).

Re claim 23, in the method disclosed by Montague et al., the step of applying a first sacrificial layer includes tapering edges of the first sacrificial layer (e.g. Figure 4).

Re claim 24, in the method disclosed by Montague et al, the step of applying a second sacrificial layer includes tapering edges of the second sacrificial layer (e.g. Figure 5).

Re claim 25, in the method disclosed by Montague et al., the tapering step includes baking the first and second sacrificial layers (e.g. column 7, line 36).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al., US 6,174,820 B1.

The method disclosed by Habermehl et al. includes all the limitations claimed except that the opening-forming step is performed during the coating step. However, forming openings during coating step by, for example, using masks is well known in the art. Thus, it would have been obvious to one of ordinary skill in the art at the time the

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invention was made to modify the method disclosed by Habermehl et al. to form an opening during the coating step as such step is well known in the art.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al., US 6,174,820 B1 in view of Robertson, III et al., US 6,534,413 B1.

The method disclosed by Habermehl et al., includes all the limitations claimed including that the step of removing the first and second sacrificial layers is performed with a reactive gas (HF) (e.g. column 16, line 31). However, Habermehl et al. are silent about immersing the micro-electromechanical device in reactive gas (HF). Robertson, III et al. disclose immersing the micro-electromechanical (MEM) device in a reactive gas comprising HF in order to remove sacrificial materials (e.g. column 5, lines 9-25). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by Habermehl et al. to immerse the micro-electromechanical device in a reactive gas as disclosed by Robertson, III in order to remove sacrificial layer (e.g. column 5, lines 9-25).

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al., US 6,174,820 B1 in view of Cheever et al., US 2003/0001251 A1.

The method disclosed by Habermehl et al. includes all the limitations claimed except the first substrate, carrying a micro-electrochemical device, is mounted on a second substrate carrying other circuit components. Cheever et al. disclose a method of interconnecting two wafers (substrates) (13 and 17), with one substrate carrying MEM

devices (15) and second substrate carrying electronic circuitry (11). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by Habermehl et al. to mount the substrate carrying a micro-electrochemical device on a substrate carrying other circuit components as disclosed by Cheever et al., in order to fabricate a device that requires different substrate characteristics (i.e. high and low-resistivity substrates) (e.g. paragraph [0015]).

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al., US 6,174,820 B1 in view of Johannsen et al., US 2002/0181725 A1. The method disclosed by Habermehl et al. includes all the limitations claimed except the moving member is coated with an anti-stiction film prior to the sealing step. Johannsen et al. disclose coating a moving member of a micro-electromechanical device with an anti-stiction film (e.g. paragraph [0065]). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by Habermehl et al. to coat the moving member of a micro-electromechanical device with an anti-stiction film as disclosed by Johannsen et al. in order to avoid failure of the MEM device due to adhesion between a moving surface and a stationary surface of the device (e.g. paragraph [0002]).

8. Claims 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al., US 6,174,820 B 1 in view of Cohn et al., US 2002/0096421 A1.



Re claim 15, the method disclosed by Habermehl et al. includes all the limitations claimed except that a plurality of micro-electromechanical devices are formed on the first substrate and encapsulated by the first film, and further comprising the step of cutting the substrate to separate the micro-electromechanical devices. Cohn et al. disclose a method of forming plurality of micro-switches (micro-electrochemical devices) (e.g. paragraph [0049]) and further cutting the substrate to separate the micro-electromechanical devices (e.g. paragraph [0089]). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made modify the method disclosed by Habermehl et al. to include the steps of forming plurality of micro-electrochemical devices, followed by cutting the substrate to separate the devices, as disclosed by Colin et al., in order to provide massive parallel assembly of sealed MEMS with high device yield (e.g. paragraph [0049]).

#### ***Allowable Subject Matter***

9. Claims 16-20 are allowed.

#### ***Response to Arguments***

10. Applicant's arguments filed 7/24/03 have been fully considered but they are not persuasive. For instance, Applicants submit that the cited art does not disclose the step of coating the second sacrificial layer with a first film. Figures 5h-5i, for example, disclose a second sacrificial layer, layer 34, (layer 34 includes 3 layers, for example,

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first and second sacrificial layers). This layer encapsulates the moving member 110, as shown in fig. 5i.

### ***Conclusion***

It is noted that all of the above references were previously cited.

**11. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (703) 305-3507. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

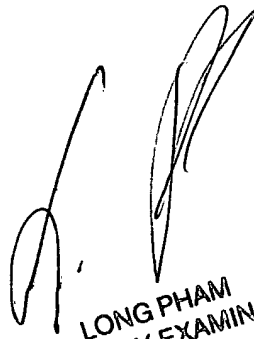
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Nathan Ha  
December 22, 2003



LONG PHAM  
PRIMARY EXAMINER